ECOSYSTEM MANAGEMENT IN THE CLINTON ADMINISTRATION

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This colloquium addresses an important issue for current natural resource management initiatives — the need to take into account our changing understanding of how ecosystems work and, in particular, of their variability. To provide context for this discussion, I thought that I might describe a few of the ventures into ecosystem management that my colleagues and I have pursued over the past three years. About seventy percent of my job as Assistant Secretary of the Interior for Fish, Wildlife and Parks has involved the development of either regional habitat protection or ecosystem management plans. Moreover, I would like to address several key issues that arise in the implementation of these plans. I hesitate to say we have answers to these issues at this point, but I believe we have learned a fair amount about the challenges that must be addressed in expanding ecosystem planning in the future.

I. RECENT EFFORTS AT ECOSYSTEM MANAGEMENT

In the four years since it came to power, the Clinton administration has taken several great strides in changing the way we address environmental concerns. In light of these efforts, it is ironic to see the public's perception of our efforts. In the first two years of the Clinton administration, the public perceived the President and his aides to be disinterested in the environment. The administration was seen as a "light shade of green": pragmatic, centrist, and taking a middle course that often left people on both sides of the environmental debate dissatisfied. Subsequently, with the election of a new Republican Congress who attacked the last 25 years of progress in environmental protection, the Clinton administration was seen primarily as defending the status quo. Neither perception is accurate.

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In fact, this administration has been intensively engaged in the design of new innovative approaches to environmental protection, particularly in the area of land and natural resource management. A large part of this effort has been linked to "reinventing" the Endangered Species Act — transforming a statute that was originally designed as a species-by-species "emergency room" regulatory tool or safety net into a comprehensive vehicle for regional multi-species habitat planning in collaboration with state and local governments, private landowners and other interest groups.

The first of our adventures into ecosystem management was addressing the spotted owl problem in the Pacific Northwest. We inherited years of heated debate in the Pacific Northwest over the relative merits of saving the spotted owl and maintaining a healthy timber industry. Failure of the two previous administrations to confront this conflict had resulted in a court injunction halting most logging on federal land in the Northwest. It was a situation that seemed to have no obvious Congressional solution since Congress had been deadlocked for years as well. Looking back on it, I find it quite remarkable that within four to five months the administration gathered a group of scientists and managers who produced a comprehensive plan to manage about 25 million acres of public forestland. That plan, which first emerged in July 1993, sought to ensure long term viability for more than a thousand species while maintaining a sustainable timber program. It called for a system of old growth and riparian reserves that was a little larger than ten million acres. It established nearly one million acres of adaptive management areas for local experiments to cut some timber while maintaining old growth forest characteristics. It created an economic revitalization and watershed restoration program and designated key watersheds to be evaluated for future management options. It also created new mechanisms for federal management agencies and regulatory agencies to work together, rather than at cross purposes. Finally, the plan established a Board of Directors — a Regional Ecosystem Steering Committee — with representatives from all of the agencies that would be responsible for the implementation of this management plan for the next 100 years.

A second, similar effort was launched at about the same time to protect and restore the Everglades ecosystem in Florida. There, we began by creating a federal (now a federal, state and tribal) task force to make sure that the Army Corps of Engineers and the State of Florida, as their "clients," would look to the natural resource agencies

(the Park Service, Fish and Wildlife Service, EPA, and National Marine Fisheries Service) in developing a comprehensive restoration plan. What we have set in motion is basically a massive public works program. The goal of the program is to restore as much of the original wetlands and hummock habitat and water flow as possible, given the development and agriculture in the area, while also providing a future water supply for Florida's east coast urban areas. By using a collaborative, multi-agency ecosystem approach, we have accelerated what would ordinarily be an eight to ten year planning process into a four year process in which the goal of the process is not flood control or navigation (the traditional Corps missions) but ecosystem restoration. In this case, the "back room boys" are actually the environmental agencies. In fact, the planning process has gone faster than we anticipated, being the beneficiary of increased funding from election year politics. We are nearly set to finalize what will probably be a three to four billion dollar restoration project over the next fifteen years.

In Southern California, an equally ambitious and innovative collaborative attempt at land use planning is proceeding under a state law entitled the Natural Communities Conservation Planning Act (NCCP). In this experiment most of the remaining open space in San Diego, Orange, and Riverside County is being planned and allocated. The process involves the State of California, the counties, half-a-dozen cities, large landowners, environmental groups, and the U.S. Fish and Wildlife Service (USFWS), who are cooperatively developing regional habitat plans designed to protect not only listed endangered species but other rare species and their habitats, as well as open space, clean water, and recreational values.

What triggered these vast planning efforts in California? In the summer of 1993, the USFWS was preparing to list the California gnatcatcher, a coastal bird, as an endangered species. Unfortunately, the gnatcatcher's coastal sage habitat is also the last remaining prime development land in Southern California; it is much sought for subdivisions and shopping centers. In response to this dilemma, we promulgated a "special rule" under the ESA that proposed delegation to the State and counties of Southern California the responsibility for determining how to conserve gnatcatcher habitat. Instead of federal biologists telling thousands of private landowners on a case-by-case basis what they could and could not do on particular parcels of land, the rule allows the state and counties to develop comprehensive science-based plans guaranteeing that enough habitat would be

conserved on a regional basis over the next 100 years. If the Department approves these plans, they will be implemented in lieu of the normal Endangered Species Act regulations.

Two major subregional plans, in which counties have created habitat reserve systems adequate to preserve dozens of potentially threatened species, not just the gnatcatcher, are now set to be approved. In effect, these plans, if approved, will assure landowners and local governments that if additional species are formally added to the federal or state endangered species lists in the future, they will have already taken care of their obligations under the Act. By moving now to protect habitat needed by dozens of species, landowners acquire certainty that their future regulatory burden will not increase.

These NCCP plans are a special version of a device called Habitat Conservation Plans (HCPs), first permitted under the Endangered Species Act in 1983. An HCP allows an individual landowner to negotiate a plan with the USFWS to conserve habitat and still permit some development on his land, even though that development might otherwise be difficult under the Endangered Species Act because of its adverse consequences for the species. A few HCPs were developed in the late 1980s, but the Clinton Administration has vastly increased the use of these plans, with more than a hundred completed and several hundred more under negotiation. Moreover, we have expanded the size, coverage, and collaborative nature of the HCPs to include agreements between major timber companies and states in the Northwest, covering hundreds of thousands of acres, to encourage multi-species HCPs that cover *anticipated* habitat needs of non-listed species, and to involve state and local governments and other stakeholders. Agreements also have been negotiated with counties, states, and private landowners to protect desert tortoises in Nevada and Utah, scrubjays in Florida, endangered songbirds in Texas, and grizzly bears in Montana.

These collaborative regional habitat protection efforts are just a few examples of the many efforts now underway.

II. TENSIONS/ISSUES

What I have tried to describe here are experiments designed to change a regulatory system constructed with the scientific assumptions of the 1970s into a strategy that sparks regional multi-species ecosystem planning. The next step is to determine what we have

learned from these experiments. There are three issues that require especially close scrutiny. First, we must delineate the proper role of science as opposed to policy. Second, we must develop both an aggressive *and* an adaptive habitat protection program, while providing long-term certainty to the regulated community. Third, we must recognize the importance of involving local stakeholders in the process.

A central feature in all of these experiments is the messiness of ecosystem management. Successful ecosystem management is not just about getting federal agencies to work together, though that is difficult enough in its own right. It is about new kinds of partnerships. It is also about bringing many diverse stakeholders to the table. There are still people in the academic community, I am afraid, who see ecosystem management as a magic tool that can be applied to natural resource conflicts to produce automatically an "optimal" result. Unfortunately, that is not how ecosystem management actually works.

Ecosystem management is never value-neutral. It is impossible to "optimize" outputs without some choice about what we are optimizing. Ultimately it is human values, not science, that must play the predominant role in deciding the goals of any ecosystem management initiative. As I realized while attending a conference on sustainable forestry about five years ago, one of the first things that must be recognized is the fact that you cannot even begin to talk about sustainable forestry until you decide exactly what it is that you are trying to sustain.

As a result, a prerequisite to the success of all these projects has been some rough common understanding or agreement at the beginning as to shared goals, or a shared vision of the desired outcome of the process. If key stakeholders and the public cannot develop enough of a consensus on goals, on a shared vision, the project is not likely to succeed. Such a shared or common agreement on a set of desired outcomes is not likely to be imposed by a federal regulatory agency acting alone. It can only emerge from the melding of competing (often conflicting) interests of various stakeholders who must be involved in the planning and decisionmaking in order for the overall effort to succeed. Together, an important group of decisionmakers must decide they have more to gain by working together toward the same mutual end point than by relying on existing regulatory mechanisms that would possibly lead to future conflict. Thus, the forging of a common set of goals is inherently a "political,"

that is, a community process. The result must command community support to succeed. It is in this sense that ecosystem management is a "messy" (i.e., political) process.

Given the need for some high degree of mutual stakeholder agreement on a set of desired outcomes, what then is the role of science? Traditionally, federal environmental regulators have taken the position that they would apply science to the regulatory language in order to determine the actions to be taken. The first year that Bruce Babbitt was Secretary of the Interior, he instructed his resource managers to do two things: use good science and engage in ecosystem management. When I discussed this with the managers in a more informal setting, I told them I could understand if they were a little perplexed. Ecosystem management, with its need to resolve multiple interests, might seem to some not the embodiment but the *opposite* of science! The Secretary, I said, saw ecosystem management and science as two tributaries coming together in one giant river and wanted his managers to be at the confluence of those two streams. This sounded fine, I told them, unless you are out there getting bounced around in a canoe trying to navigate all the turbulent waves created by the confluence.

But my analogy begs the question of what *is* the role of science in ecosystem management? From my own personal experience, I would make two observations. First, even though we talk about "science-based" planning and decision-making, there is never enough information to feel confident about a particular decision. No key ecosystem management decision ever gets made in a setting of adequate information. Second, even if the science were adequate, it would not compel a particular right answer. Science can predict outcomes, assess risks, and eliminate options, but it cannot dictate the answer. In the end, decision-making will be based on the values that have been adopted in the process. In the end, plans and decisions always result from policy choices, not exclusively from science.

The second feature of every one of the projects in which I have been involved is the tension between the mutual interest of the resource agency and the land owner in generous up-front habitat protection in order to provide long-term certainty to the regulated community versus the need for flexibility, or "adaptive management," as our understanding of conditions change in the future. Traditionally, the tension between regulator and landowner has been over how much to set aside to meet a particular regulatory requirement. Even in the traditional HCP (one landowner, one species) the agency

pushes for more protection in exchange for development approval on the landowner's remaining holdings, while the landowner argues for less.

But with large multi-species regional HCPs, that dynamic is changing. In a sense, the agency is now "selling insurance" against possible but unforeseen future new regulatory requirements. The more the landowner pays, the more insurance he can buy. The more acres of habitat set aside in a permanent reserve system, the longer the guarantee period in years. The more species the plan seeks to protect, which of course requires additional habitat set asides, the more regulatory security since the landowner is protected against a wider possible future set of regulatory burdens that might result from the listing of additional species as endangered or from new science showing that currently listed species need more habitat than previously thought.

As a result, the landowner and agency often push each other in the same direction: toward very generous immediate habitat reserve set asides in exchange for a generous grant of immunity from *future* additional set aside requirements that might result from future listings of species or new understanding of species' needs.

Unfortunately, we are now discovering that the ecosystems we seek to protect through this kind of innovative regulation do not ordinarily tend toward a steady state. Indeed, today's configured habitat reserve system may prove less effective as baseline features of the ecosystems change over time. The response to this evolving knowledge is to employ "adaptive management," which means simply that as conditions change, the plan is revisited and adjusted. It may be that new understanding of a species requires the protection of more habitat. It may also be, however, that you will discover that a species does not need as much habitat as previously thought. Thus, the more we conceive of nature as ever-changing, the more it is necessary to build into habitat plans opportunities for future adaptive management.

But, of course, adaptive management works against certainty. The nature of a plan is to limit flexibility in order to extract generous protection up front. Natural resource agencies desire certainty and landowners need certainty so that they know how they can manage or develop their lands, but both these needs are in direct conflict with the need for adaptive management.

In the projects I have discussed here, the issue is not so much how to "do" adaptive management as it is how to negotiate adaptive

management in the initial plan. The likely spectrum of uncertainty needs to be carefully considered. The plan needs to contain certain detailed provisions about what is or is not subject to revision, when and how revisions will be made, who will bear the costs, and who gets to decide these issues. The conflict between the need for certainty over a significant period of time (certainty for the landowners being the quid pro quo for immediate voluntary protection of habitat far in excess of what regulation alone could require) and the need to protect opportunities for adaptive management as the ecosystem changes and scientific understanding grows may be the single biggest challenge facing successful ecosystem management today.

The final issue I mentioned is the role of local communities once an ecosystem management strategy is implemented. An important component of ecosystem management is to push decision-making down the chain of command in order to gain the involvement of the people who are going to have to deal with the consequences of the plan. Ideally, the role of the federal government in these federal, state, and local planning coalitions should be to set the standards, to make sure that the scientific standards have integrity, to oversee the process, to provide technical support, and perhaps to provide some financial support. The planning, however, should be done on a local level as much as possible. Once a plan is developed and implemented, however, there must be a continuing role in management, monitoring, and adaptive revisions to the plan for all stakeholders. We are only beginning to confront this issue.

III. OPPORTUNITIES TO LEARN

There are two developing areas of research and thinking to which I believe we must be attentive in thinking about the future of ecosystem management. First, the new study of how different types of complex adaptive systems behave, and what they have in common, may teach us a great deal. I spent some time recently at the Santa Fe Institute, which focuses on this new study of complexity theory and began to understand its relevance to the management of natural systems. The Institute looks at many different kinds of complex adaptive systems (i.e. the stock market, the HIV virus, ecosystem evolution) and, through the use of computer models, looks for derivable rules or behavioral characteristics that are common to these systems.

One particularly interesting concept from complexity theory is the behavior of systems on the edge of chaos. A system that is in a constant steady state is not a system that is evolving, and therefore is not particularly resilient to a major disturbance of some kind because it is not in an "adaptive" mode. On the other hand, a system that gets so responsive that it is constantly adapting to every tiny input is so agitated that it may slip into chaos. It is the systems that are on the ridge between perfect stability and chaos that may be best situated to adapt to changing circumstances and therefore "improve" themselves over time.

A second idea that comes out of complexity theory is the idea of how decisions are made in emergent systems. A beehive does not "decide" in some familiar, linear fashion to detach itself from one tree and move to another. A forest does not decide to shift in a particular direction out of conscious deliberation. How do these "decisions" emerge in complex systems? These decisions are relevant to ecosystem management because of the evolving decision-making devices that our new approach uses. It seems that what we are really doing with ecosystem management is inventing new places for decisions to be made.

Successful ecosystem management may also depend on being very attentive to the metaphors we have for nature. As William Cronon suggested in *On Common Ground*, nature is much more elusive than we think. Nature is not an independent entity that can be studied and fixed. It is, in part, a reflection of how we see it. For example, I was involved in the issue of whether to bring Texas cougars to Florida to breed with the endangered Florida panther. Some people thought this was a legal issue, others saw it as a biological or ethical issue. In the end, the decision turned in some part on competing *perceptions* of nature: What is a species in the context of today's understanding of genetic variability? Is it more "natural" or valuable to try at all costs to protect a pure species (i.e., Florida panthers) even if we fail and lose the gene pool entirely, or should we make sure we save panthers in Florida even if it means diluting the gene pool to preserve it?

CONCLUSION

Currently, we are fundamentally reinventing the way we will do natural resource management and protection in the future — particularly with respect to private land. At the same time we are rediscovering the variability of the natural systems we seek to manage and protect. In some cases these developments may produce new tensions, for example, between the need for certainty as a tool of habitat protection and the need to expand the practice of adaptive management. However, we may also gain new insights that can strengthen ecosystem management. Successful resource protection strategies will require that managers remain attentive and "adaptive" to this changing understanding of nature and natural systems.